

THE PROFITABILITY ANALYSIS OF DAIRY CATTLE BUSINESS ON THE GROUP OF DAIRY FARMERS IN WEST UNGARAN DISTRICT SEMARANG REGENCY

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ABSTRAK

Penelitian ini bertujuan untuk menentukan profitabilitas usaha sapi perah pada anggota kelompok tani ternak (KTT) di Kecamatan Ungaran Barat Kabupaten Semarang. Penelitian ini dilakukan pada bulan Februari sampai Maret 2016 dengan metode survei. Responden dalam penelitian ini adalah peternak sapi perah laktasi pada anggota kelompok tani ternak di Kecamatan Ungaran Barat. Penentuan desa sampel menggunakan metode purposive. Penentuan sampel menggunakan metode sensus sebanyak 40 orang, yaitu 11 responden KTT Mardi Mulyo, 4 responden KTT Sumber Hasil dan 25 responden KTT Ngudi Makmur. Analisis data menggunakan analisis regresi linier berganda, pendapatan, R/C rasio dan profitabilitas. Hasil penelitian menunjukkan bahwa rata-rata pendapatan atas biaya tunai Rp.34.708.139,20/tahun atau Rp.2.892.344,93/bulan dan rata - rata pendapatan atas total biaya Rp.4.867.808,92/tahun atau Rp. 405.650,74/bulan. Nilai profitabilitas 10,34% lebih besar dari suku bunga bank untuk kredit usaha peternakan sebesar 5%/tahun. Dapat disimpulkan bahwa usaha sapi perah pada anggota KTT di Kecamatan Ungaran Barat menguntungkan.

Kata kunci: sapi perah, kelompok tani ternak, profitabilitas, pendapatan

ABSTRACT

The objective of the study was to determine the profitability of dairy cattle business on the group of dairy farming in District of West Ungaran, Semarang Regency. This research was conducted from February to March 2016 through a survey method. Respondents in this study were lactating dairy farmers on the group of dairy farmers in District of West Ungaran. Then, location was determined by using purposive sampling. Further, respondents were determined by using census method for 40 people; those were 11 respondents of Mardi Mulyo farmer group members, 4 respondents of Sumber Hasil members, and 25 respondents of Ngudi Makmur members. Then, data were analyzed by employing the analysis of income and profitability. The result of study indicated that the average income over the cash cost was as much as IDR. 34,708,139.20 per year or IDR.2,892,344.93 per month, and the average income over the total cost was as much as IDR.4,867,808.92 per year or IDR. 405,650.74 per month. The profitability was 10.34% greater than the bank interest for farming business loans for 5% per year. It could be concluded that dairy cattle business on the group of dairy farmers in West Ungaran was profitable.

Keywords: dairy cattle, group of dairy farmers, profitability, Income.

INTRODUCTION

West Ungaran District is one of development centers for dairy cattle in Semarang Regency. This region has promising population potential and dairy milk production with the highest number of dairy cattle after Getasan District. The condition of population growth and the dairy milk production in West Ungaran District has recently undergone a decrease. According to the data in 2013, the population number of 1,830 decreased into 1,032; whereas, the milk production in 2013 was for 2,753,007 that decreased into 2,613,000 in 2014 (BPS. District of West Ungaran, 2015). This condition needed attention, so that the future population and dairy milk production could increase. Hills *et al.* (2015) and Sartori *et al.* (2002) stated that in addition, environmental factors feed, the temperature also affects the milk production. At temperature aboved the 25-26 °C, cows begin to experience heat stress that can cause a decrease in milk production (Kadzere *et al.*, 2002). Thau (2004), stated that other factor affecting milk production were the level of education, farming experience, the existing of capital and credit and extension agents and training of farmers.

In general, the dairy cattle business run by the member farmers which is included in farmer group tends to be home industry with the ownership of 2-3 dairy cows for each, and the technology used is still simple so low milk production. Besides, the farmers have limitations in rearing their businesses. In this case, it may make the farmers do not count the production input costs spent for the business as well as revenue acquired. Srairi *et al.* (2011) stated that milk production could be rapidly improved by balancing dietary rations that enabled the average milk yield of lactating cows to be reached, optimising feed costs and reducing the cost of milk production. If the production input cost and the revenue are counted and economically alocated, the dairy cattle business could be profitable.

One of the successful indicators that the dairy cattle business could be measured from the revenue and profitability acquired. The profitability of a dairy business is largely determined by milk revenues and feed costs (Hultgren *et al.*, 2011). Profitability or in other words, the business profitability in the present study was the comparison in percentage between the net revenue and the business total costs. In

percentage, the greater the revenue or the profitability was acquired, the higher the total cost was spent; thus, the business becomes more successful or more profitable.

Haloho *et al.* (2013) stated that profitability is a way to measure the ability of a business to generate a profit from an asset or source of income. Profitability of dairy cattle farming is very important to know whether the business carried on within a certain period can be profitable or not for farmers. Prasetyo *et al.* (2012) stated that profitability is the main purpose of a business. It can be obtained when the amount of business income greater than the amount of expenditures. A business can be indicated feasible to be developed if its profit is always increased. In particular, the purpose of the study was to determine the profitability of dairy cattle business in West Ungaran District, Semarang Regency.

MATERIALS AND METHODS

The present study was conducted in West Ungaran District, Semarang Regency in February to March 2016, by employing survey method. The location for conducting the study was determined through purposive sampling resulting in 2 villages; those were Lerep Village and Nyatnyono Village. The respondents in the study were dairy farmers having lactating dairy cattle on three farmer group members in West Ungaran District in which they were determined by employing census method that resulted in 40 respondents; those were 11 respondents from Mardi Mulyo members, 4 respondents from Sumber Hasil members, and 25 respondents from Ngudi Makmur members.

The research location was determined using purposive sampling. Data collected were primary and secondary data. They were collected through direct interview to the farmers by employing questionnaire and direct observation in the field. The targets of the study were the member farmers joining group in West Ungaran District.

The data were analyzed by employing the analysis of multiple linier regresion, income, return cost ratio and profitability.

Multiple Linier Regresion

Multiple linear regression was used to determine factors affecting production of dairy cows on the basis of Soekartawi (2002):

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e \dots\dots\dots (1)$$

Where

- Y : Milk production (liter/year)
A : Constants
X1 : Amount of forage (kg/year)
X2 : Amount of feed concentrate (kg/year)
X3 : Amount of feed pulp (kg/year)
X4 : Number of labor (hour/year)
b1- b4 : Regression coefficients
e : Error

Simultaneously Regression Test

Simultaneously regression testing of using the F test was used to determine the simultaneously effect or simultaneously independent variable (X) to the dependent variable (Y).

Partial Regression Test

Partial regression test can be found by using the t test to determine the effect of each independent variable (X) to the dependent variable (Y).

Income

Costs and revenue of the dairy cattle business was calculated by formula according to Soekartawi (2002):

$$TR = P_y \times Y \quad \dots\dots\dots (2)$$

$$TC = T_{bt} + T_{bd}$$

$$\pi_{\text{cash}} = TR_{\text{total}} - TC_{\text{cash}}$$

$$\pi_{\text{total}} = TR_{\text{total}} - (TC_{\text{cash}} + Bd)$$

Where :

- TR : The total of dairy farmer revenue (IDR/year)
TC : The cost total of dairy farmer (IDR/year)
 π : Revenue (IDR/year)
Bd : The costs counted (IDR/year)
Py : The output price (IDR/year)
Y : The total of the output (Kg/year)
T_{bt} : The total of cash costs (IDR/year)
T_{bd} : The total of costs calculated (IDR/year)

Return Cost Ratio

Return cost (R/C ratio) was calculated based on the formula of Soekartawi (2002):

$$R/C \text{ on the cash cost} = (\text{Total revenue})/(\text{Total Cost}) = TR / (TC_{\text{cash}}) \quad \dots\dots\dots (3)$$

$$R/C \text{ on total cost} = (\text{Total revenue})/(\text{Total Cost}) = TR/(TC_{\text{cash}} + Bd) \quad \dots\dots\dots (4)$$

Assessment criteria was:

- If the value of R/C ratio > 1 then, dairy cattle business efficiently.
- If the value of R/C ratio < 1 then the dairy cattle business is not efficient.
- If the R / C ratio = 1 then the farm is said to breakeven (BEP).

Profitability

Profitability was obtained from the comparison in percentage between net revenue and the total cost (Riyanto (1995):

$$\text{Profitability} = \text{Total Income} / \text{Total Cost} \times 100\% \quad \dots\dots\dots (5)$$

Explanation:

- If profitability \leq the level of bank interest applied, the dairy cattle business is not profitable.
- If profitability \geq the level of bank interest applied, the dairy cattle business is profitable.

RESULTS AND DISCUSSION

Profile of the Members of the Dairy Cattle Community

The Community of Dairy Farmers Mardi Mulyo was established since 2007 with 24 members. There are 20 active members and 4 passive members. Among the active members, there were only 13 members having dairy cows. Among those 13 members, there are only 11 having lactation dairy cows. The *Sumber Hasil* members was established in 2010 with 7 members. Those seven members are still active till now and among them, there were 4 members having lactation dairy cows.

Ngudi Makmur members was founded in 1989 with 15 members. In 2007, it became 34 members. Now, there were 27 active members; whereas 7 members were passive. In 2010 and 2013, this community attained a government aid of 25 dairy cows, 15 dairy cows were private businesses with dairy herds ownership of 1 - 2 dairy cows, whereas dairy the rest are inheritance and purchased. This community works with Indonesian government bank (BRI) for farm loans with interest per year for 5%.

Factors Affecting Milk Production

Factors considered on dairy cow milk

production on farmers in the West Ungaran district was forage (X1), concentrate (X2), tofu (X3), labor (X4) (D'Antoni *et al.* 2013). From the analysis results of multiple linear regression on the Table 1 showed that the coefficient of determination (R²) as much as 92.3 percent with determination corrected of value (adjusted R²) as much as 91.5 percent. This means that 91.5 percent of the variation in milk production (Y) can be explained that the variation of the four variables factor the forage, concentrates, pulp, and labor (100 percent - 91.5 percent = 8.5 percent) explained of other factors outside the model.

The results of simultan analysis test obtained the F_{count} value as much as 105.421, with the probability value was 0,000. Because the probability value was much smaller to 0.05, it can be stated that the variable forage, concentrates, pulp, and labor used in the activities dairy cattle business have a together significant have a on the milk production of dairy cows.

T-test results of four independent variables included in the regression model found that the variable concentrates and pulp out not significant or influential. It is seen from the value of the probability of significance to concentrate amounted to 0,550 and pulp amounted to 0.318, both well above the 0.05 confidence level. While forage and significant labor at the level of 0.05. Can be seen of the significance probability value of forage as much as 0.000 and workforce amount to 0.049. Thus obtained equation of multiple linear as follows:

$$Y = 387.443 + 0.346 + 0.103 X_1 + 0.174X_2 X_3 - 2.039X_4$$

From the above equation, constant value was 387.443, it means that if considered independent variable constant, then average milk production as much as 387.443 liters/year. The regression coefficient of forage would be 0.346, means that each additional 1 kg of forage will increase production milk amounted to 0.346 liters/year. Mukson *et al.* (2010) stated that each increasing of forage will increase milk production. The regression coefficient of labor as much as -2.039, means that each additional 1 hour/year will reduce milk production as much as -2.039 liters/year.

The Analysis of Dairy Cattle Business

The analysis of dairy cattle business can be measured from cost, revenue, income, return cost ration as well as profitability.

Dairy Cattle Business Cost. Cost of production consists of dairy cattle, cage depreciation, facility depreciation and cost of electricity, forage and concentrate feed, artificial insemination, medicine and labor (Haloyo *et al.*, 2013). In research cost can in the categories into cash costs and cost counted. The cash cost means a number of money paid to purchase input for the process of dairy cattle business. The cash cost consists of the purchase of concentrate feed, tofu, bran, animal health cost (medicine and IB), labor outside family, electricity bill, and transportation bill. The cost counted is cost that is not incurred in cash in the production process. The cost counted consists of forage, the budget of labor within a family, land lease, and cage and equipment depreciation.

According to Table 2 showed that the respondents' cost average of the dairy cattle business was IDR 47,075,441.88 which was acquired from the average of cash cost as much as IDR 17,235,111.60 and the cash counted was as much as IDR 29,840,330.27 per year. The result of the study indicated that the biggest cost from the total cost of production was feed cost consisting of forage, concentrate, tofu, bran as much as 77.2% from the production total cost. Sarma *et al.* (2014) stated that feed cost has been always larger of other costs. Haloyo *et al.* (2013) and Mohd Nor *et al.* (2012) stated that the biggest cost incurred for production process was feed cost as much as 75,36% ; 44,5% and 40%. Further, Hafeez and Rahman (2014) and Ragkos *et al.* (2015) asserted that the production cost of the largest dairy cattle business was feed cost as much

Table 1. Analysis Results of Multiple Linear Regression

Variables	Coefficient of Regression	Significance
Constant	387.443	0.727
Forage	0.346	0.000***
Concentrate	0.174	0.550
Tofu	0.103	0.318
Labor	-2.039	0.049**
F test	105.421	0.000***
R ²	92.30	
R ² (Adj)	91.50	

*** (P<0.01); ** (P<0.05); * (P<0.1); ns : not significant

Table 2. Average Cost, Average Revenue, Average Income and Return Cost Ratio

Description	Average IDR/year	Persentase (%)
1. Business cost		
A. Cash Cost		
Concentrate	8,695,350.00	18.5
Tofu	4,932,000.00	10.5
Bran	1,260,000.00	2.7
Labor outside family	720,000.00	1.5
Artificial insemination	108,750.00	0.2
Medicine	332,026.00	0.7
Electricity bill	75,861.00	0.2
Transportation	1,111,125.00	2.4
The Total Of Cash Cost	17,235,111.60	36.6
B. Cost Counted		
Forage	21,459,375.00	45.6
Labor within family	6,926,016.00	14.7
Electricity installation	39,061.00	0.1
Land lease	932,391.00	2.0
Cage depreciation	272,756.00	0.6
Equipment depreciation	210,654.00	0.4
Total Cost Counted	29,840,330.27	63.4
Total Cost (A+B)	47,075,441.88	100
2. Revenue		
C. Cash Revenue		
Milk sales	27,605,250.00	53.1
Livestock sales	9,862,500.83	19.0
The Total of Cash Revenue	37,467,750.83	72.1
D. Revenue Counted		
Calf consumption	3,100,500.00	6.0
The livestock plus value	11,375,000.00	21.9
Total Cost Counted	14,475,500.00	27.9
Total Revenue (C+D)	51,943,250.83	100
3. Income		
Income on cash cost	34,708,139.20	
Income on total cost	4,867,808.92	
4. Return Cost Ratio		
Return cost ratio on cash cost	3.01	
Return cost ratio on total cost	1.10	

as 80.9% and 88.9% from the production total cost because feed is one of the basic needs of dairy cattle except the development and growth as well as the process of milk production.

Dairy Cattle Business Revenue. Revenue is a result of multiplying the number of production with price. The farmer's revenue consists of cash revenue and revenue counted. The cash revenue comes from milk sales, as well as culled cows sales, and male calves sold (Haloyo *et al.*, 2013). Revenue counted comes from milk given for calves and the livestock plus value. According to Table 2 showed that the total revenue average as much as IDR 51,943,250.83 was acquired from the cash revenue average and the revenue counted. The average of cash revenue was as much as IDR 37,467,750.83 (72.1%) that consists of revenue from milk sales as much as IDR 27,605,250.00 (53.1%) and the revenue average from the livestock sales IDR 9,862,500.83 (19.0%). The revenue average counted was as much as IDR 14,475,500.00 (27.9%) consisting of feeding to calves as much as IDR 3,100,500.00 (6.0%) and the revenue average of cattle plus value as much as IDR 11,375,000.00 (21.9%). The result of the study showed that the revenue average from fresh milk sales as much as 53.1% greater than the total revenue average from dairy cattle farm. This result was based on Prasetyo *et al.* (2005) and Ragkos *et al.* (2015) who stated that the biggest revenue came from the result of milk sales as much as 49.06% and 87.8% from the total revenue because the main product of dairy cattle was milk, and it was followed by other products.

The Income of Daily Cattle Business

The income of daily cattle business in this study was categorized into revenue on cash cost and income on total cost. Table 2 showed that the respondents' average income on cash cost was as much as IDR 34,708,139.20 per year or IDR 2,892,344.93 per month. Whereas, the income average on total cost was as much as IDR 4,867,808.92 per year or IDR 405,650.74 per month smaller than the work minimum wage in Semarang Regency as much as IDR 1,415,000.00 per month. This because farmers are still weak in lending money in the bank for increasing business scale and In a traditional management system, so the goal of cattle business for profit frequently fails to achieve (Roessali *et al.*, 2011). Mukson *et al.* (2010) stated that the dairy cattle in Semarang

Regency still faces a number of problems, one of which is limited access to bank loans. In addition, lack of capital and other inputs including the problems increase in business (Monzote *et al.*, 2009). Besides, problems farmers income of dairy cattle can also influenced by the experience, knowledge and attitude of farmers (Eddy *et al.*, 2012). The benefit obtained was significantly affected by capital that the optimal use of capital and in accordance with the need will increase profit optimally (Haloho *et al.*, 2013).

Return Cost Ratio. R/C ratio is the total revenue divided with total cost. The R/C ratio of daily cattle business in this study was categorized into two; those were R/C ratio on cash cost and R/C ratio on total cost. According to Table 2 showed that the respondents' Average R/C ratio on cash cost was as much as 3.01. This means value that any cash outlay IDR 1.00 will give revenue as much as IDR 3.01. Whereas, the average R/C ratio on total cost was as much as IDR 1.10. This means value that every IDR. 1.00 incurred by farmers gained revenue as much as IDR 1.10. This result was based on Haloho *et al.* (2013) and Hafeez and Rahman (2014) that the dairy cattle business 1.4 and 1.68, which means that any expenditure 1.00 will give revenue IDR 1.4 and 1.68.

Profitability. Riyanto (1995) asserted that the ratio analysis of business profitability employed the comparison between net revenue and cost in percentage. According to the calculation result, profitability value was acquired for 10,34% per year in which it meant it was higher than the interest rate of BRI that applied for cattle business credit in West Ungaran District as much as 5% per year. Further, according to the research result of Haloho *et al.* (2013) who stated that the profitability value of people daily cattle business in Semarang was as much as 43.46% greater than the nasional bank (BNI) interest rate for March 2013 as much as 4.25%, therefore the dairy cattle business was feasible to operate. Ragkos *et al.* (2015) stated that the operation of the dairy farm is profitable in the short run.

CONCLUSION

The dairy cattle business on the farmer group members in West Ungaran District, Semarang was profitable in which the respondents acquired greater revenue average than the work

minimum wage which applied in Semarang as well as profitability value as much as 10.34% greater than the interest rate of 5% per year. The dairy cattle business on the farmer group members in West Ungaran should be developed.

REFERENCES

- Badan Pusat Statistik. 2015. Kecamatan Ungaran Barat dalam Angka. Badan Pusat Statistik, Kabupaten Semarang.
- D'Antoni, J.M., A. K. Mishra and D. Blayney. 2013. Assessing participation in the milk income loss contract program and its impact on milk production. *Journal of Policy Modeling*. 35(2): 243-254.
- Eddy, B.T., W. Roessali and S. Marzuki. 2012. Dairy cattle farmers' behaviour and factors affecting the effort to enhance the economic of scale at Getasan District, Semarang Regency. *J. Indonesian Trop. Anim. Agric.* 37(3):220 - 22.
- Hafeez, A.S.M.G. and M.W. Rahman. 2014. Economics of small scale dairy farming in urban areas of Bangladesh - Constraints and Opportunities. *Intl. J. Sci. Res.* 3:2296-2301.
- Haloho, R.D., S.I. Santoso, S. Marzuki, W. Roessali and A. Setiadi. 2013. Profit function analysis of dairy cattle farming in Getasan and west Ungaran Districts, Semarang Regency. *J. Indonesian Trop. Anim. Agric.* 38 (2):116-122.
- Hills, J.L., W.J. Wales, F.R. Dunshea, S.C. Garcia and J.R. Roche. 2015. Invited review: An evaluation of the likely effects of individualized feeding of concentrate supplements to pasture-based dairy cows. *J. Dairy Sci.* 98(3):1363-1401.
- Hultgren, J., C. Svensson and M. Pehrsson. 2011. Rearing conditions and lifetime milk revenues in Swedish dairy cows. *J. Livest. Sci.* 137:108-115.
- Kadzere, C.T., M.R. Murphy, N. Silanikove and E. Maltz. 2002. Heat stress in lactating dairy cows: a review. *Livest. Prod. Sci.* 77:59-91.
- Mohd, Nor, W. Steeneveld, M.C.M. Mourits and H. Hogeveen. 2012. Estimating the costs of rearing young dairy cattle in the Netherlands using a simulation model that accounts for uncertainty related to diseases. *J. Preventive Vet. Med.* 106:214-224.
- Monzote, F.R.F., M. Monzote, E.A. Lantiaga and H.V. Keulen. 2009. Conversion of specialised dairy farming systems into sustainable mixed farming systems in Cuba. *J. Environ. Dev. Sustain.* 11:765-783.
- Mukson, T. Ekowati, M. Handayani and S. Gayatri. 2010. The Potency of dairy cattle agribusiness development in Semarang Regency, Central Java. *J. Indonesian Trop. Anim. Agric.* 35(3):179-184.
- Prasetyo, E., Sunarso, P. B. Santosa and E. Rianto. 2012. The influence of agribusiness subsystem on beef cattle Fattening farm's profit in Central Java. *J. Indonesian Trop. Anim. Agric.* 37 (2):121-126.
- Prasetyo, E., T. Ekowati and Mukson. 2005. Kondisi dan potensi pengembangan usahatani ternak sapi perah di Kabupaten Semarang. *J. Indonesian Trop. Anim. Agric.* 30(2):110-118.
- Ragkos, A., A. Theodoridis, A. Fachouridis and C. Batzios. 2015. Dairy farmers' strategies against the crisis and the economic performance of farms. *Procedia, Economics and Finance* 33. The 7th International Conference, The Economies of Balkan and Eastern Europe Countries in the changed world, EBEEC, May 8 - 10, 2015. P. 518 - 527.
- Riyanto, B. 1995. *Dasar - Dasar Pembelanjaan Perusahaan*. BPFE. Yogyakarta.
- Roessali, W., Masyhuri, S. Nurtini and D.H. Darwanto. 2011. Factors influencing farmers' decision to increase beef cattle business scale in Central Java Province. *J. Indonesian Trop. Anim. Agric.* 36(1):27-35.
- Sarma, P.K., S.K. Raha and H. Jorgensen. 2014. An economic analysis of beef cattle fattening in selected areas of Pabna and Sirajgonj Districts. *J. Bangladesh Agril. Univ.* 12 (1):127-134.
- Sartori, R., R. Sartor-Bergfelt, S.A. Mertens, J.N. Guenther, J.J. Parrish and M.C. Wiltbank. 2002. Fertilization and early embryonic development in heifers and lactating cows in summer and lactating and dry cows in winter. *J. Dairy Sci.* 85:2803-2812.
- Soekartawi. 2002. *Teori Ekonomi Produksi dengan Pokok Bahasan Analisis Fungsi Cobb-Douglas*. Rajawali Pers, Jakarta.
- Srairi, M. T., M. E. Jaouhari, A. Saydi, M. Kuper and P.L. Gal. 2011. Supporting small-scale dairy farmers in increasing milk

production: evidence from Morocco. Trop. Anim. Health Prod. 43(1): 41-49.
Thau, T.D. 2004. Factors affecting technical

efficiency of household dairy cattle production in two Communes of Gialam District, Hanoi. J. ISSAAS. 10(1):86-90.